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Application for

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STACK COMPRISING WIDE SHEETS WITH NARROW FOLDED WIDTH

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Background

This invention relates to folded sheets of tissue or similar material. More particularly, the invention relates to large interfolded wet wipes which are folded in a unique way to provide a narrow width stack.

Wet wipes are well known products which are used for wiping surfaces. Some wet wipes are particularly suited for wiping areas of the human body and other wet wipes are intended for wiping inanimate surfaces.

Wet wipes are typically folded and interfolded to form a stack which is packaged in a container which protects the wipes from drying. Some examples of wet wipes are described in U.S. Patent Nos. 5,540332 and 6,202,845 and U.S. Patent Publication No. 2002/0039638 A1.

There is a growing wipes market for large interfolded towel size wipes, e.g., 8-1/2 inches x 11 or 12 inches wide. Some of these new products are dust cloths, disinfectant wipes, floor cleaning wipes, industrial wipes, sanitizing wipes, adult wipes, etc. Most of the equipment such as tubs, flow wrappers, ribbon saws, etc., are set for the baby wipes market with a folded width of 3-1/2 inches to 4-1/2 inches. Most of these new products are in the 20 to 45 count range and are dispensed out of the center of a flow wrap package with a resealable pull tab that is resealed after each use. There are few known folds for large wipes on the market that meet this need.

Summary of the Invention

The invention provides a novel fold geometry which allows wide sheets to be folded and interleaved or interfolded to form a stack with a narrow width. The fold geometry permits wide sheets to be packaged in standard size packages which are designed for smaller sheets. The folded sheets provide a flat pack with no ply build-up across the width of the package. The novel fold geometry also permits the folded sheets to be stacked without interfolding. The fold provides a folded two-ply edge in the center of the stack to facilitate grasping and withdrawing individual sheets.

Description of the Drawing

The invention will be explained in conjunction with illustrative embodiments shown in the accompanying drawing in which --

Figure 1 is an end view of a container and a stack of folded and interfolded sheets which are formed in accordance with the invention;

Figure 2 is an enlarged view of the stack of Figure 1;

Figure 3 illustrates two of the folded sheets of Figure 2 which are not interfolded for clarity of illustration of the fold geometry;

Figure 4 illustrates a stack of sheets which are folded in accordance with the invention and which are non-interfolded;

Figure 5 is a view similar to Figure 1 in which the top

sheet of the stack is provided with a starter tab;

Figure 6 is an enlarged view of the stack of Figure 1; and

Figures 7 and 8 show different embodiments of laying up the webs normally or by inverting every other web before the forming plates.

Description of Specific Embodiments

Referring to Figure 1, a stack 10 of interleaved or interfolded sheets is contained within a container or dispenser 11. The container may be conventional and may include a bottom wall 12, a pair of sidewalls 13, a pair of end walls 14, and a top wall 15. An opening 16 is provided in the top wall for withdrawing the sheets.

Before use, the opening 16 may be closed with a tear-out tab, plastic film, or the like. If the stack comprises premoistened sheets or wet wipes, the opening can be in the form of a narrow slit to reduce the exposure of the stack. Alternatively, the top wall of the container can be provided by a hinged or removable lid or cover which can be opened to provide access to the stack and closed to protect the stack. The container can also be provided by a flow wrap package with a resealable pull-tab that is resealed after each use.

The stack 10 is formed from two groups of folded sheets -- right folded sheets 21 and left folded sheets 22. In the particular embodiment illustrated in the drawing, each right

folded sheet 21 is folded in half at a first fold 23 in the center of the sheet so that the edges 24 and 25 of the sheet are substantially aligned.

The term "substantially aligned" is intended to encompass normal variances when conventional folding plates are used. Such variances can amount to up to 4% of the unfolded length of the sheet. For a common 8 inches wide wipe a 4% variance is 0.32 inch.

Additional variance can occur on the two outside lanes of a wide web which is slit into a plurality of narrower slit webs which are then folded. When the wide web is not perfectly centered before slitting (which is almost always the case) or does not perfectly conform to the expected width, the two outside lanes or slit webs will be affected. For example, for a typical 8 inch slit width, the two outside slit webs may have widths of 7.75 inches and 8.25 inches. The difference in sheet width shows up at edges 24 and 25 and adds to the variance of up to 4%.

The folded sheet forms two plies 26 and 27, and the two plies are folded at a second fold 28 which is spaced from the edges 24 and 25 to provide a folded portion 29 which extends between the folds 23 and 28.

The folded sheet 21 includes a first panel 31 which extends from the edge 24 to the fold 28, a second panel 32 which extends from the edge 25 to the fold 28, a third panel 33 which is a continuation of the second panel 32 and which extends from the fold 28 to the fold 23, and a fourth panel 34 which is a

continuation of the first panel 31 and which extends from the fold 28 to the fold 23. The third and fourth panels are joined at the fold 23.

Each left folded sheet 22 is similarly folded in half at a first fold 36 so that the edges 37 and 38 of the sheet are substantially aligned and the sheet forms two plies 39 and 40. The folded sheet is folded at a second fold 41 to provide a folded portion 42 which extends between the folds 36 and 41. The folded sheet includes a first panel 43, a second panel 44, a third panel 45, and a fourth panel 46. The third and fourth panels are joined at the fold 36.

The folds 23 and 36 do not have to be precisely at the center of the sheet, and the edges 24, 25 and 37, 38 do not have to be precisely aligned. The folds can be made within a central portion of the sheet which extends to either side of the center or midline of the sheet for about 10 percent of the width of the unfolded sheet. However, folding the sheets at the center so that the edges are substantially aligned provides a stack which is evenly balanced at the edges.

The second folds 28 and 41 of the sheets are preferably positioned so that the folded portions 29 and 42 are about equal to, or slightly less than, one-half of the width of the upper panels, or about 1/6 of the unfolded width of the sheet. When the sheets are stacked as illustrated in Figure 2, the folded portions 29 and 42 do not overlap. However, the folds 28 and 41 of the two groups of sheets are preferably relatively close to

each other and to the centerline CL of the stack and may even be aligned with the centerline. The stack is therefore evenly balanced and has the same number of panels or plies at substantially all vertical cross sections through the stack which are parallel to the edges 24, 25, 37, 38, or folds 28, 41.

In Figure 2 the top panel 31 of each of the right folded sheets 21 is interleaved or interfolded between the second ad third panels 45 and 46 of one of the left folded sheets 22. The top panel 43 of each of the left folded sheets is interleaved or interfolded between the second and third panels 32 and 33 of a right folded sheet 21. The top panel of the uppermost sheet in the stack is not interfolded. The top panel, which can optionally be provided with a starter tab, is therefore available to be pulled through an opening in the container or overwrap or out of the open top of a tub.

When the top sheet is withdrawn from the container, the folded portion 29 or 42 of the top sheet which underlies the top panel 31 or 43 of the next sheet draws a portion of the top panel 31 or 43 out of the container as illustrated at 50 in Figure 1. The next sheet is then in position to be dispensed by pulling the tab portion 50. When the second sheet is withdrawn from the container, the folded portion 29 or 42 thereof pulls a portion of the top panel of the next sheet out of the container.

The folded portions 29, 42 underlie about one-half of the top panel of the next sheet, or about 1/6 of the unfolded width of the sheet. If the sheet is a wet wipe, only a minor

portion of the sheet is exposed outside of the container. The dimension of the pull tab 50 is no longer than the pull tab of many stacks which have much narrower sheets.

The folded and interfolded sheets can be produced on conventional folding machines which are well known in the art.

The fold geometry permits large interfolded tissues, towels, and wet wipes to be provided in a stack which has a substantially narrower width than the unfolded sheet. Folding the sheets twice as described herein reduces the width of the stack to about one-third of the unfolded width of the sheet. A sheet which is 11 to 12 inches wide can therefore be packaged in a tub, wrapper, or container which has a conventional width of about 3.5 to 4.5 inches.

The folded sheets can also be stacked without interfolding. If the sheets are not interfolded, the stack is advantageously oriented so that the folded portions 29, 42 of the sheets face the opening in the container. If the opening is in the top of the container, the stack may be oriented as shown in Figure 4. The folded portion 29 or 42 of the top sheet provides a two-ply edge in the center of the package which is easy to grasp and withdraw.

Figure 5 illustrates a container 11 and a stack 110 which is similar to the stack 10 of Figure 1 except that the top panel 31 of the top sheet is folded substantially in half at a fold 50 to form a starter tab 51. The starter tab can be grasped through the opening 16 of the container and assists in pulling

the top sheet of the stack out of the container.

Figure 6 shows the stack 110 outside of the container.

Figures 7 and 8 show alternate embodiments of stacks which are formed by laying up the webs normally or by inverting every other web before the forming plates. These alternate embodiments can be desirable in some cases to improve dispensing characteristics based upon web surface, lotion, add-on, sticktion, and other properties. The term "sticktion" is a word of art which is used to describe web properties when one web pulls the next web out during sheet dispensing.

Referring to Figure 7, on some webs or substrates there is marked difference between the texture and feel on the two sides of the web. Some webs, for example, could be smoother on one side of the web than on the other side. Normally on a machine the webs follow a path through the machine to the forming plates that is identical. Therefore, the webs are folded into a stack with a certain relationship of the outside of the web off the parent roll to the inside of the web off the parent roll. In some dispensing applications this relationship is not the most ideal. For example, the top sheet in a stack and the second sheet could have their rough sides facing each other, and the second and third sheets could have their smooth sides facing each other. In one case, say the rough to rough side, an additional sheet may be pulled out of the container, also known as roping. In the other case of smooth side to smooth side, the next sheet may not pop up out of the container at all, known as fallback. To

solve this problem, what is done is to invert every other web on its travel to the forming plates. This changes the relationship of which sides of the webs are laid up into the folded stack. In some cases this change can greatly increase (for the better) dispensing characteristics.

Figures 7 and 8 illustrate the same stack, but the surfaces of the webs are oriented oppositely in the two stacks. Each stack includes right folded sheets 61 and left folded sheets 62. Each of the right folded sheets has a pair of surfaces 63 and 64 which are represented by a solid line and a dashed line, respectively. The surface 63 represented by the solid line represents, for example, the surface of the web that is on the outside of the parent roll when the web is unwound from the parent roll. Each of the left folded sheets 62 likewise includes a pair of surfaces 65 and 66 which are represented by a solid line and a dashed line respectively.

In Figures 7 and 8 the right folded sheets 61 are oriented the same way in both figures. However, the surfaces of the left folded sheets 62 are inverted or flipped between the two figures. This results in a different orientation or facing relationship between the solid surfaces and the dashed line surfaces of the sheets 61 and 62.

Some of the advantages of the fold geometry described herein are:

1. A standard baby wipe package can be used for a large wipe.

2. The top sheet has a small dispensing tab, which is the same size as smaller baby wipes.

3. The folded sheets can be stacked either interfolded or non-interfolded.

4. If the stack is non-interfolded, the sheets provide a nice two-ply edge in the center of the package, and the user can easily insert his fingers thereunder.

5. The folded sheets provide a flat pack with no ply build-up across the package.

6. The stack can be used in both tub and overwrap packaging.

7. The stack has similar dispensing geometry and characteristics of many proven folds.

8. The stack includes only one style of fold, in both right-fold and left-fold configurations.

9. No additional ribbon/package width is required for tucking in the interfold.

10. The fold can be produced on current wet wipe lines.

While in the foregoing specification a detailed description of specific embodiments of the invention was set forth for the purpose of illustration, it will be understood that many of the details hereingiven may be varied considerably by those skilled in the art without departing from the spirit and scope of the invention.